III.   <u>REMARKS</u>

As an initial matter, the Examiner has not considered three of the documents filed

with the Information Disclosure Statement (IDS) filed July 10, 2006. The Examiner has

given no reason for not considering three documents, namely JP 2001-147800, JP 2001-

92796, and CN 1423772. The relevance of these three documents is shown by the

International Search Report for the International Application corresponding to the present

U.S. Patent Application. Therefore, <u>Applicant contends that the Examiner should consider</u>

<u>these three documents</u>.

As another initial matter, there is a typographical error regarding Foreign Patent

Document No. 2 of the IDS filed July 10, 2006. This document is WO 00/10<u>1</u>03 and not WO

00/103<u>0</u>3. As evident from the PAIRs database of the United States Patent and Trademark

Office (USPTO), Applicant filed an electronic copy of WO 00/10103 on July 10, 2006, so the

Examiner has considered the correct document, WO 00/10103.

With the above amendments, the specification has been amended to remove reference

to particular claims. A substitute specification in compliance with 37 C.F.R. §1.125 is

attached. The attached substitute specification contains no new matter.

Claims 26-28, 30, 31, 33, 36-38, 40, 41, 43 and 45-50 have been amended to improve

grammar and clarity, which has no further limiting effect on the scope of these claims.

Furthermore, claims 26, 27, 36, 45, 46 and 50 have been amended to recite "a plurality of

information processing units <u>arranged in a ring shape</u>" as supported on page 33, lines 18-20,

and as shown in Figure 1 of Applicant's disclosure as originally filed. Independent claim 36

has been amended to recite "a plurality of information processing units <u>arranged in a ring</u>

<u>shape</u> and distributing and making available data to the plurality of the information

processing units" as supported on page 33, lines 18-24, and as shown in Figure 1 of

Applicant's disclosure as originally filed. Independent claim 37 has been amended to recite

"a plurality of memory modules <u>arranged in a ring shape</u> and distributing and making

available data to the plurality of information processing units" as supported on page 33, lines

18-24, and as shown in Figure 1 of Applicant's disclosure as originally filed.

Independent claim 26 has also been amended to recite

> "means for giving a global sequence number across all of the plurality
> of information processing units to the item value in the value list in the local
> information block, wherein a duplicate item value in the item values in the
> value list from the other second information processing unit is deleted when
> there is a duplicate value between the value lists transmitted to the first
> information processing unit and received from the other second information
> processing unit"

as supported on page 44, lines 2-14, of Applicant's specification as originally filed.

Independent claim 27 has been amended to improve grammar and clarity, and to

incorporate subject matter from previous claim 29. Independent claim 27 has also been

amended to recite

> "order judgment means for determining a global sequence number of
> the item value in the value list held by this memory module across the global
> information block based on a relative sequence number of the item value in the
> value list held by this memory module and for storing the global sequence
> number of the item value in the value list held by this memory module into a
> global value number array for each item, wherein the value list held by this
> memory module is compared with each of the received value lists, a duplicative
> value from each of the received value lists is deleted when there is a duplicative
> value between the value list held by this memory module and each of the
> received value lists, and the relative sequence number is determined in relation
> to the received value lists"

as supported by previous claims 27 and 29, and on page 40, line 22, to page 41, line 5, and on

page 44, lines 2-14, of Applicant's specification as originally filed.

Claim 28, which depends upon claim 27, has been amended so as to recite

> "wherein the information processing system further comprises record
> extraction means for specifying a value in the global ordered set array in
> accordance with an instruction to specify a sequence number of the record
> and extracting the record indicated by the specified value"

as supported on page 23, lines 11-14, and by original claim 21, of Applicant's disclosure as originally filed.

Independent claim 37 has been amended to improve grammar and clarity, and to incorporate subject matter from previous claim 39.

The preamble of independent claim 45 has been amended to recite a "program maintained in a memory of an information processing system" as supported on page 3, line 23, to page 4, line 13, of Applicant's specification as originally filed.

The present amendment adds no new matter to the application.

A.   The Invention

The present invention pertains to an information processing system, method and program such as may be used to process information at high speeds. In accordance with an apparatus embodiment of the present invention, an information processing system is provided that includes features recited by independent claim 26. In accordance with another apparatus embodiment of the present invention, an information processing system is provided that includes features recited by independent claim 27. In accordance with yet another apparatus embodiment of the present invention, an information processing system is provided that includes features recited by independent claim 46. In accordance with still another apparatus embodiment of the present invention, an information processing system is provided that includes features recited by independent claim 50.

In accordance with a method embodiment of the present invention, an information processing method for use in an information processing system is provided that includes the steps recited by independent claim 36. In accordance with another method embodiment of the present invention, an information processing method for use in an information processing system is provided that includes the steps recited by independent claim 37.

In accordance with another embodiment of the present invention, a program maintained in a memory of an information processing system is provided, wherein the program causes execution of the steps recited by independent claim 45.

Various other embodiments, in accordance with the present invention, are recited by the dependent claims. An advantage provided by the various apparatus, method and program embodiments of the present invention is that the apparatus, method and program embodiments provide and/or use a computer architecture that is capable of realizing very high speed parallel processing.

B. The Rejections

Claim 45 stands rejected under 35 U.S.C. § 101 for being directed to non-statutory subject matter.

Claims 33-35, 43 and 44 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 26-34 and 36-50 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Furusho (EP 1,233,332, hereafter, "Furusho'332 Document") in view of Furusho (EP 1,136,918, hereafter "Furusho'918 Document"). Claim 35 stands rejected under 35 U.S.C. § 103(a) as unpatentable over the Furusho'332 Document in view of the Furusho'918 Document, in further view of Yip (U.S. Patent Application Publication No. US 2002/0027516, hereafter the "Yip Publication").

In view of the present amendment, Applicant respectfully traverses the Examiner's rejections and requests reconsideration of the above-captioned application for the following reasons.

C.   Applicant's Arguments

In view of the present amendment, claims 26-28, 30, 31, 33, 36-38, 40, 41, 43 and 45-50 are now in compliance with the requirements of 35 U.S.C. § 112.

i. The Section 101 Rejection

Claim 45 now recites a "program <u>maintained in a memory</u> of an information processing system." The Federal Circuit has ruled that computer programs embodied in a tangible medium are statutory subject matter under 35 U.S.C. § 101. <u>In re Beauregard</u>, 53 F.3d 1583, 1584 (Fed. Cir. 1995). Therefore, independent claim 45 which pertains to a computer program embodied in a "tangible medium" (i.e., a memory of an information processing system) is statutory subject matter under 35 U.S.C. § 101.

ii. The Section 103 Rejections

A <u>prima facie</u> case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining the references in the manner claimed. <u>KSR International Co. v. Teleflex Inc.</u>, 127 S.Ct. 1727, 1739-41 (2007); <u>In re Oetiker</u>, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). In this case, the Examiner has failed to establish a <u>prima facie</u> case of obviousness against Applicant's claimed invention because the Furusho'332 Document, the Furusho'918 Document, and the Yip Publication, either alone or in combination, fail to teach, or suggest, each and every limitation of the claims.

iii. <u>The Furusho'332 Document</u>

The Furusho'332 Document discloses an "information processing system" wherein a distributed memory type information processing system comprises: (a) a CPU module, (b) a plurality of memory modules, each of which has a processor and RAM core, and (c) a plurality of sets of buses that make connections between the CPU and memory modules and/or connections among memory modules, where the processors of the various memory modules execute the processing of arrays managed by the one or more memory modules based on instructions given by the CPU to the processors of the various memory modules (See Abstract of the Furusho'332 Document). According to Furusho, in this system the processor of the memory module comprises: (1) sorting means that executes a sort on the elements that make up those portions of the array that it itself manages, and reorders the elements according to a specific order, I/O that, depending on the positions that the portions managed by itself occupy within the array, sends the sorted elements together with their sequence numbers to another memory module via a stipulated bus, or receives the elements and sequence numbers from another memory module via a stipulated bus, (2) sequence number calculation means that, upon receipt of the element and sequence number, compares it with the elements that it manages itself and calculates a virtual sequence number which is a candidate for the sequence number of the received element, and returns it to the other memory module, and (3) sequence determination means that, upon receipt of the virtual sequence number, determines the sequence of elements according to the virtual sequence numbers (See Abstract of the Furusho'332 Document). Thus, in according to the Furusho'332 Document, the sequence numbers of elements of the array are determined by means of communication between a presentation memory module on the side that sends the element and sequence number and a determination memory module on the side that receives the

element and sequence number and calculates the virtual sequence number (See Abstract of the Furusho'332 Document).

However, the Furusho'332 Document does not teach, or suggest, (i) a plurality of information processing units <u>arranged in a ring shape</u>" as recited by claims 26, 36, 45 and 46 (ii) a plurality of memory modules <u>arranged in a ring shape</u>" as recited by claims 27 and 37, and (iii) a plurality of information units <u>arranged in a ring shape</u>" as recited by claim 50. The "memory modules" (14-1), (14-2), (14-3) as shown in Figure 1 of the Furusho'332 Document are not arranged in a ring shape. Instead, as shown in Figure 1 of the Furusho'332 Document, the memory modules are connected with a reconfigurable bus (col. 15, lines 25-51). Therefore, as would be instantly realized by a person of ordinary skill in the art, the information processing unit, in accordance with the present invention, is substantially different from the memory module disclosed by the Furusho'332 Document with respect to how the information processing units or memory modules are connected to one another. Furthermore, the embodiment recited by claim 26 of the present invention includes "means for transmitting the value list to one adjacent first information processing unit through the packet transmission path" and "means for receiving the value list from an other second adjacent information processing unit through the packet transmission path." This additional structure for connecting the information process units is not disclosed by the Furusho'332 Document.

These deficiencies, however, are not the only deficiencies in the disclosure of the Furusho'332 Document. The Furusho'332 Document also does not teach, or suggest, (iv)

> "<u>means for giving a global sequence number across all of the plurality of information processing units</u> to the item value in the value list in the local information block, wherein <u>a duplicate item value</u> in the item values in the value list from the other second information processing unit <u>is deleted when there is a duplicate value between the value lists transmitted to the first information processing unit and received from the other second information processing unit</u>"

as recited by independent claim 26, (v)

> "<u>order judgment means for determining a global sequence number of
> the item value in the value list held by this memory module across the global
> information block based on a relative sequence number of the item value in the
> value list held by this memory module and for storing the global sequence
> number of the item value in the value list held by this memory module into a
> global value number array for each item</u>, wherein the value list held by this
> memory module is compared with each of the received value lists, <u>a duplicative
> value from each of the received value lists is deleted when there is a duplicative
> value between the value list held by this memory module and each of the
> received value lists</u>, and the relative sequence number is determined in relation
> to the received value lists"

as recited by claim 27, (vi)

> "<u>deleting a duplicate item value</u> in the item values in the value list
> from the other second information processing unit <u>when there is a duplicate
> value between the value lists transmitted from this processing unit and received
> from the other second processing units</u>"

as recited by claim 36, (vii)

> "an order judgment step comprising…(2) <u>deleting a duplicate item value
> from each of the received value lists when there is a duplicate value between
> the value list held by this memory module and each of the received value lists</u>"

as recited by claim 37, (viii)

> "<u>deleting a duplicative item value</u> in item values in the value list from
> the other adjacent second information processing unit <u>when there is a duplicate
> value between the value lists transmitted from this processing unit and received
> from the other adjacent second information processing unit</u>"

as recited by claim 45, and (ix)

> "the global tabular data contains, for each item, unique global sequence
> numbers of the item values held by all of the information processing units, <u>the unique
> global sequence numbers are given to the item values by deleting a duplicate item
> value</u>"

as recited by claim 46. In accordance with these non-limiting embodiments of the present

invention, the deletion of duplicate value is accomplished so that the information processing

unit (i.e., a "PMM") refers to the packet in which the duplicate item value was deleted,

compares the value in the packet (i.e., the item value in the value list received from the

adjacent information processing unit) with the item value in its own value list, and specifies a relative position (order) in view of the item value of the other group information processing units (PMMs), (See, e.g., Applicant's English translation (i.e., originally filed specification) of the present application, at 44, lines 2-14). Furthermore, according to the present invention, the packet after the duplicate item value is deleted is transmitted to the adjacent information processing unit (PMM), (See Applicant's specification, at 44, lines 15-17).

In addition, in accordance with the present invention, the local information block includes a value list having the item values stored in order of item value numbers (for example, see Claim 26). Accordingly, the packet including the value list that is to be transferred from one information processing unit to another adjacent information processing unit <u>does not</u> contain any duplicate value and, therefore, <u>it is **not** necessary to make the transmitted data to include additional information about the data duplication</u>.

The memory module disclosed by the Furusho'332 Document is configured such that, in order to prevent duplicate elements from being repeatedly sent over the bus, the former group of PMMs sends element and the number of duplication (i.e., redundancy) for each element to the latter group of PMMs as described at col. 28, lines 5-9, of the Furusho'332 Document. Furthermore, the deletion of duplication according to the Furusho'332 Document means that the transmission of the duplication element is prevented and/or the duplication element and the number of duplication (redundancy) is deleted from the memory module after the processing operation in the memory module, as would be understood by a person of ordinary skill in the art.

For all of the above reasons, the deletion of duplicate item value, in accordance with the present invention as claimed, is different from the "deletion" of duplication as disclosed in the Furusho'332 Document. In other words, the Furusho'332 Document does not teach, or

suggest, the deletion of duplicate item value in accordance with the presently claimed

invention.

However, these are not the only deficiencies in the disclosure of the Furusho'332

Document. As admitted by the Examiner (Office Action, dated April 15, 2008, at 6, lines 8-

9; at 9, lines 1-2; at 17, line 17, to 18, line 14; at 19, lines 11-12), the Furusho'332 Document

does not teach, or suggest, how the records are stored, namely, (x)

> "the local information block includes a value list having the item values
> stored in order of item value numbers indicating positions of the item values in
> the value list, and a pointer array in which pointer values indicate the item value
> numbers stored in order of unique local sequence numbers corresponding to the
> records"

as recited by claims 26, 36 and 45 (xi)

> "a value list having the item values stored in order of item value numbers
> indicting positions of the item values in the value list and also includes a pointer array
> having pointer values that indicate the item value numbers stored in order of unique
> local sequence numbers corresponding to the records"

as recited by claim 27, (xii)

> "an information block for each item in order to represent tabular data
> expressed as an array of records including item values belonging to respective
> items so that the information block includes a value list having the item values
> stored in order of item value numbers indicating positions of the item values in
> the value list and also includes a pointer array having pointer values that indicate
> the item value numbers stored in order of unique local sequence numbers
> corresponding to the records"

as recited by claim 37, (xiii) "record extraction means" as recited by claim 46, and (xv)

> "an information block arranged to represent tabular data expressed
> as an array of records including item values belonging to respective items,
> the information block including a value list having the item values stored in
> order of item value numbers indicating positions of the item values in the
> value list, and a pointer array in which pointer values to indicate the item
> value numbers are stored in order of unique local sequence numbers
> corresponding to the records"

as recited by claim 50.

iv. The Furusho'918 Document

The Furusho'918 Document discloses a "method and apparatus for retrieving, accumulating, and sorting table-formatted data," wherein the method for searching for and tabulating table-format data is represented as an array of records including fields containing field values for each field, wherein the method includes the steps of: (a) keeping in a storage device, a value control table containing field values in the order of field value numbers corresponding to field values belonging to a specific field, and a field value number-specifying information array containing information that specifies the field value numbers in the order of records, (b) acquiring from the field value number- specifying information array the field value number corresponding to the specific record, and (c) obtaining from the field values stored in the value control table the field value corresponding to the field value number thus acquired (See Abstract of the Furusho'918 Document).

v. The Yip Publication

The Yip Publication discloses "entropy encoding and decoding," which pertains to a method of entropy coding symbols representative of a code block comprising transform coefficients of a digital image (See Abstract of the Yip Publication).

vi. Summary of the Disclosures

The combination of the Furusho'332 Document, the Furusho'918 Document and the Yip Publication still fails to teach, or even suggest, (i) a plurality of information processing units arranged in a ring shape" as recited by claims 26, 36, 45 and 46 (ii) a plurality of memory modules arranged in a ring shape" as recited by claims 27 and 37, and (iii) a plurality of information units arranged in a ring shape" as recited by claim 50. The

combination of the Furusho'332 Document, the Furusho'918 Document and the Yip

Publication also fails to teach, or even suggest, (iv)

"means for giving a global sequence number across all of the plurality of information processing units to the item value in the value list in the local information block, wherein a duplicate item value in the item values in the value list from the other second information processing unit is deleted when there is a duplicate value between the value lists transmitted to the first information processing unit and received from the other second information processing unit"

as recited by independent claim 26, (v)

"order judgment means for determining a global sequence number of the item value in the value list held by this memory module across the global information block based on a relative sequence number of the item value in the value list held by this memory module and for storing the global sequence number of the item value in the value list held by this memory module into a global value number array for each item, wherein the value list held by this memory module is compared with each of the received value lists, a duplicative value from each of the received value lists is deleted when there is a duplicative value between the value list held by this memory module and each of the received value lists, and the relative sequence number is determined in relation to the received value lists"

as recited by claim 27, (vi)

"deleting a duplicate item value in the item values in the value list from the other second information processing unit when there is a duplicate value between the value lists transmitted from this processing unit and received from the other second processing units"

as recited by claim 36, (vii)

"an order judgment step comprising...(2) deleting a duplicate item value from each of the received value lists when there is a duplicate value between the value list held by this memory module and each of the received value lists"

as recited by claim 37, (viii)

"deleting a duplicative item value in item values in the value list from the other adjacent second information processing unit when there is a duplicate value between the value lists transmitted from this processing unit and received from the other adjacent second information processing unit"

as recited by claim 45, and (ix)

"the global tabular data contains, for each item, unique global sequence numbers of the item values held by all of the information processing units, <u>the unique global sequence numbers are given to the item values by deleting a duplicate item value</u>"

as recited by claim 46.

For all of the above reasons, the Examiner has failed to establish a <u>prima facie</u> case of obviousness against Applicant's claimed invention.
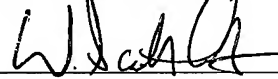

III.   CONCLUSION

In view of the present amendment, claims 26-28, 30, 31, 33, 36-38, 40, 41, 43 and 45-50 are in compliance with the requirements of 35 U.S.C. §§ 101 and 112. Furthermore, the Examiner has failed to establish a <u>prima facie</u> case of obviousness against the claimed invention because the combination of the Furusho'332 Document, the Furusho'918 Document, and the Yip Publication does not teach each and every claimed limitation arranged as in the claims.

For all of the above reasons, claims 26-28, 30, 31, 33, 36-38, 40, 41, 43 and 45-50 are in condition for allowance and a prompt notice of allowance is earnestly solicited.

The below-signed attorney for Applicant welcomes any questions.

Respectfully submitted,

GRIFFIN & SZIPL, P.C.

Joerg-Uwe Szipl
Registration No. 31,799

GRIFFIN & SZIPL, P.C.
Suite PH-1
2300 Ninth Street, South
Arlington, VA 22204

Telephone: (703) 979-5700
Facsimile: (703) 979-7429
Email: GANDS@szipl.com
Customer No.: 24203